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**REMARKS**

Claims 1-7 and 23-24 are now pending in the application. Claims 8-22 are cancelled by this amendment. Applicant has thoroughly reviewed the outstanding Office Action including the Examiner's remarks and the references cited therein. The following remarks are believed to be fully responsive to the Office Action, and to render all the claims at issue patentably distinguishable over the cited references.

Applicant note that the Office Action sent 5/04/04 indicates that only claims 1-22 are pending. Nevertheless, the response filed 2/5/04 added new claims 23 and 24. The Applicant requests that the indicate the addition of these claims and note them as pending in the application.

**CLAIM REJECTIONS – 35 U.S.C. §103**

Claims 1, 2, 5 and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Galligan et al. (U.S. Patent No. 5,422,331) in view of Deshpande et al. (U.S. Patent No. 6,110,439). Claims 1, 2, 3, 4, and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rorabaugh et al. (U.S. Patent No. 5,958,583) in view of Meyer et al. (U.S. Patent No. 4,542,113). Claims 1-7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Butler et al. (U.S. Patent No. 6,497,776) in view of Meyer et al. (U.S. Patent No. 4,542,113) or Deshpande et al. (U.S. Patent No. 6,110,439).

Filed herewith is a Declaration under 37 CFR 1.131 executed by the inventor. The Exhibits in the Declaration provide evidence of enough weight and character to show conception and/or reduction to practice of the claimed invention prior to the

effective dates of Deshpande et al., Rorabaugh et al., and Butler et al. Therefore, Deshpande et al., Rorabaugh et al., and Butler et al. can not be applied as proper prior art references to the pending claims. Also, as reasoned in previous responses the cited art, alone or in combination does not teach or reasonably suggest the elements of the pending claims. Therefore, the remaining references, alone or in combination, do not teach or fairly suggest each of the presently pending claims.

Therefore, each of the pending claims 1-7 and 23-24 are in condition for allowance. The Applicant requests that the Examiner withdraw each of the rejections and allow each of the pending claims.

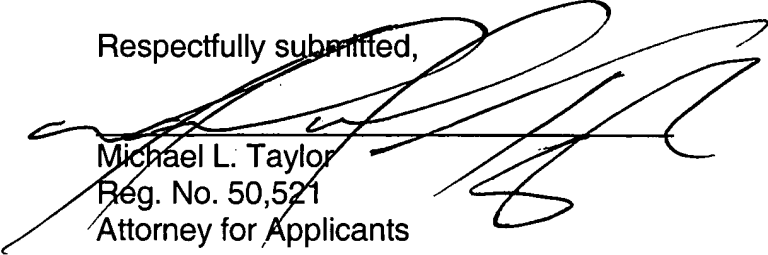
#### **CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Date: 9/26/, 2004

HARNES, DICKEY & PIERCE, P.L.C.  
P.O. Box 828  
Bloomfield Hills, MI 48303  
(248) 641-1600  
MLT/lkj

Respectfully submitted,

  
Michael L. Taylor  
Reg. No. 50,521  
Attorney for Applicants



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application No.: 09/918,158  
Filing Date: July 30, 2001  
Applicant: Robert A. Dichiara Jr.  
Group Art Unit: 1731  
Examiner: Christopher A. Fiorilla  
Title: OXIDE BASED CERAMIC MATRIX COMPOSITES  
Attorney Docket: 7784-000146

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Director of the United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

**DECLARATION UNDER 37 C.F.R. § 1.131**

Sir:

I hereby declare under penalty of perjury as follows:

1. That I am the sole inventor of the above-identified application.
2. That the invention was conceived and at least partially reduced to practice in this country prior to February 24, 1994, the filing date of the United States Patent No. 5,422,331 to Galligan et al. and prior to December 20, 1996, the filing date of the United States Patent No. 5,958,583 to Rorabaugh et al. In addition, this invention was

conceived and at least partially reduced to practice in this country prior to December 15, 1999, the filing date of United States Patent No. 6,497,776 to Butler et al., and prior to March 3, 1998, the filing date of United States Patent No. 6,110,439 to Deshpande et al.

3. I am the author of the notebook whose cover page is attached at Exhibit A. Pages from this notebook are attached as Exhibits B and C and the information contained within this notebook was either prepared by myself or under my direction.

4. That the invention was conceived and/or reduced to practice prior to February 25, 1994, as evidenced by the notebook page attached as Exhibit B. Exhibit B illustrates at least the initial conception and reduction to practice of a composition embodied by at least claim 1. A second page from the notebook is attached as Exhibit C and shows reduction to practice of a further embodiment of the invention claimed in at least claim 1 prior to February 25, 1994.

5. That the invention has never been abandoned, suppressed, or concealed.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are being made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false

statements may jeopardize the validity of the application, and patent issuing thereon, or any patent to which this verified statement is directed.

Dated: 8/25/04 Robert A. Dichiara, Jr.  
Robert A. Dichiara, Jr.

Department Genetics

Subject CHL (M-106)

Name R. DiGiara

Address \_\_\_\_\_



43-649

Laboratory  
Research Notebook

Dennison National Company, Holyoke, MA 01041



11" x 9 1/4" 4 x 4 Quad.

200 Sheets - 100 Sets

0 73333 43649 5

OK M-106

Charge #: IR-53704

VARIABLES		
A	Mullite (Baikalox Submicron $\text{Al}_2\text{O}_3/\text{SiO}_2$ : 1.75)	Silica Sol/Mul 1.3

LAMINATE SIZE: 6.5" (Warp direction) x 9.5" (Fill direction) untrimmed

# Plies: 8

- a) Heat clean a piece of 8HS Nicalon fabric 39" wide (Fill direction) by 13" long (Warp direction).  
 b) Make up mix and use just after mixing or remix before use. Put 500 grams of Silica Sol (Nalco 2327) into the small ball mill and add 375 grams of submicron Baikalex Mullite ( $\text{Al}_2\text{O}_3/\text{SiO}_2$ : 1.75) mix for 0.5 hours. Add 1.5 grams of Dow Corning antifoam 1410. Mix for 3.5 hours use mixture after this point. If observe foaming when opening up mill or viscosity not right for prepreging let Bob D. know. If cannot use that day, ball mill mixture again for 2 hours before use.  
 c) Hand prepreg the fabric try and achieve about 33 % fiber to matrix ratio and lay-up 8 wet plies nested together, 6.5" (Warp direction) x 9.5".

d) Fabric Wt. 127.7 g,Prepreg Wt. (actual) 307.1 g.Fiber/Matrix ratio = Fabric Wt./Prepreg Wt. (actual) x 100 = 41.6 %.

e) Press cure the laminate

Apply 200 psi immediately and heat press to 200°F hold for 1/2 hour.

Heat press to 220°F at 1°F/min and hold for 1/2 hour.

Heat press to 350°F at 1°F/min. and hold for 1/2 hour.

Remove laminate for post curing. 2000°Ff) Post cure: To 1500°F 2 hr at 5 to 10°F/minute.

g) Do physicals: % Porosity, % Matrix and % Fiber.

h) Cut laminate into flexure samples (0.5" x 5.5" [Warp direction]).

i) Heat treat samples placing samples into furnace at temperature and remove to room temperature.

m) Test Samples:	Heat Treated	Testing Temperature
4 Flexure	None	RT
<del>4 Flexure</del>	<del>1500°F/1hr</del>	<del>1500°F</del>
4 Flexure	2000°F/1hr	2000°F
<del>4 Flexure</del>	<del>2000°F/1hr</del>	<del>RT</del>
	<u>2400</u>	

## COMMENTS:

Program held with power Sat out 180 until 7:50pm. Went to 210°F for 1/2 hr.

Then to 425°F / 1°F/min hold 1 hour. on 10-7-93 7:30AM removed from

245° press. Panel looked excellent, uniform surface and .105" thick  
 seems hard. Post cured to 2000°F for 2 hrs. Part hardened up  
 within 5 minutes at 180°F. Mixture patters-up after one  
 day in a closed container

There is a key  
 here for other work  
 as well. Good dense  
 laminate. # Submicron  
 material  
 # 2 viscosity slurry  
 # 3 Bleeder package

May want to Repeat with  $\text{H}_2\text{O}_2$  <sup>from</sup> <sub>cont</sub>

May want to try submic.  
 mullite in phosphate  
 chemistry as well. See if  
 submicron is major effect.  
 on viscosity

Charge #: IR-569030

## VARIABLES

A	Alumina (SM-8)	B. Silica Sol/Alumina	1.3
C.	Nextel 610 (alumina fiber)		

LAMINATE SIZE: 6.5" (Warp direction) x 9.5" (Fill direction) untrimmed

# Plies: 8

a) Use heat cleaned Nextel 610 (8HS fabric) 39" wide (Fill direction) by 13" long (Warp direction).  
 b) Make up mixture and use just after mixing or remix just before use. Put 500 grams of Silica Sol (Nalco 2327) into the small ball mill and add 375 grams of submicron BaikaloX SM-8 (Al<sub>2</sub>O<sub>3</sub>) mix for 0.5 hours. Add 1.5 grams of Dow Corning antifoam 1410. Mix for 3.5 hours use mixture after this point. If observe foaming when opening up mill add 0.5 grams of antifoam 1410, tumble for 5 minutes and record on sheet. If problems or viscosity not right for prepregging let Bob D. know. If cannot use that day, ball mill mixture again for 2 hours before use.

If slurry still appears good from Alum/Sol-I-1 you can use slurry again if you high shear at 5000 rpm's for 5 minutes (please make note on sheet of the material you used).

c) Hand prepreg the fabric try and achieve about 38-40 % fiber to matrix ratio and lay-up 8 wet plies nested together, 6.5" (Warp direction) x 9.5".

d) Fabric Wt. 108.8 g.Prepreg Wt. (actual) 244.7 g.Fiber/Matrix ratio = Fabric Wt./Prepreg Wt. (actual) x 100 = 44.2 %.

e) Make up cork dam set up with bleaderlease C on both sides like used in Mul-IV-1.

f) Press cure the laminate,  
 use one layer of armolon and one layer of pink release glass on both sides  
 Apply 200 psi immediately and heat press at 2°F/min. to 180°F hold for 1.5 hour.  
 Heat press to 210°F at 1°F/min and hold for 1 hour.  
 Heat press to 425°F at 5°F/min. and hold for 1 hour.  
 Remove laminate for post curing.

g) Post cure: To 2000°F/2 hr at 5 to 10°F/minute.

h) Reinfiltarate with SiO<sub>2</sub> Sol. (Nalco 2327) 2 times.

i) Weigh panel to start and reinfiltate panel with Silica Sol under vacuum (30" Hg) for 30 min.. Remove panel from sol and place in oven at 300°F for 30 min.. Pull panel out of oven and when at room temperature wipe off excessive silica powder off of surface and weigh. Repeat process 2 times. Weight as made 136.5 g, 1st infiltration 141.2 g, 2nd infiltration 143.7 g.

j) Fire panel to 2000°F for 2 hours. After firing \_\_\_\_\_ g.

k) Cut panel in half and dry at 220°F.

l) Reinfiltarate half the panel with SiO<sub>2</sub> Sol. (Nalco 2327) for 2 more times.

m) Weigh panel to start and reinfiltate panel with Silica Sol..

Weight as made \_\_\_\_\_ g, 3rd infiltration \_\_\_\_\_ g, 4th infiltration \_\_\_\_\_ g,

n) Fire panel to 2000°F for 2 hours. After firing \_\_\_\_\_ g.

o) Do physicals: % Porosity, % Matrix and % Fiber.

p) Cut laminate into flexure samples (0.5" x 5.5" [Warp direction]).

q) Heat treat samples placing samples into furnace at-temperature and remove to room temperature.

r) Mechanical test both 2 and 4 times infiltarted panels.

Test Samples:	Heat Treated	Testing Temperature
4 Flexure	None	RT
4 Flexure	1800°F/1hr	1800°F

## COMMENTS:

yields 800 gms of slurry after ball milling  
 or 480 ml



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